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OXC-0290-60
 Copy 5 of 5
 20 January 1960

MEMORANDUM FOR: Chief, Materiel Branch, DFD-DD/P

SUBJECT : Report of Trip - [] to Pratt Whitney Plant, FRDC
 January 11-13, 1960 - Fuel Control Calibration Facility

(b)(3)

1. General

A. Pursuant to a contemplated requirement presented by []
 [] Pratt Whitney Co. for the installation of a Fuel Control Calibration Facility at Watertown, the undersigned was directed to inspect and review a similar installation at the FRDC plant.

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B. Consideration for this requirement is predicated on the service and calibration of the J1-11 control system requiring a fuel system test bench similar to the present facility now in use at FRDC. This consideration also involves a choice as to whether the facility should be installed at Watertown or whether the tests should be conducted at FRDC, West Palm Beach, Florida.

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C. [] strongly recommends that the facility be located at Watertown, however, based upon an observation of the installation and discussions with engineers at the plant regarding the service requirements necessary to support the facility, it would appear that such decision should be based primarily on the economics of the installation and operational expediency of testing and servicing the pumps and fuel control system.

D. The fuel test bench proper is estimated at \$150,000. The services requirements are beyond the present capability of Watertown which would have to be provided at additional cost. Billeting and accommodation of qualified technical personnel would also be required.

E. Comparative costs of airlift between FRDC and Watertown, operational and timing requirements and supplementary costs of modifying the test facility at FRDC are factors not yet known.

2. Test Facilities Required

A. Fuel system test bench similar to "Greer Bench" now in use at FRDC with certain modifications.

B. A hydraulic pump drive adapter and hydraulic fluid loop must be provided. The hydraulic fluid loop must contain provisions for heating the fluid to above 75°F.

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SECRETGXC-0250-60
PAGE TWO

C. An adapter for installation of the A/B pump and an air supply capable of delivering compressed air at the rate of $3\frac{1}{2}$ pounds per second at 220 PSIA and 1200°F will be required.

D. Services required in addition to the high pressure hot air are:

350 psi compressed air @ 10 SCFM
 90 psi compressed air @ 80 SCFM
 Cooling water @ 150 gpm @ 8°F. (Water tower and circulation system.)
 350 KW electric power @ 440V - three phase
 1 KW electric power @ 110V - one phase
 100 PPH of Steam @ 350°F saturated
 Building of dust tight construction, explosion proof electrical fixtures, exhaust ventilation and evaporative air cooling for the test unit in addition to out buildings to house the compressors and boiler plant.

3. Test Facilities Inspected at PRDC

A. Two test facilities were inspected - one in the main plant consisting of the test bench (G.H. 7811, modified - Pratt Whitney P.O. No. 950) equipped with three boards of instrumentation and test mountings; a 250 h.p. Reliance 460 V D.C. centrifugal compressor and a motor-generator set with 200 KW - 435 amp D.C. unit and 300 h.p. A.C. Drive. Space required for this installation is approximately 15' X 25' for the M-G set and controls and approximately 20' X 30' for the test unit. The high decibel noise level of the compressor obviously showed that it should be isolated from the test unit. Steam and compressed air were supplied from the plant sources. The other test unit visited, known as the D-19 unit is located some distance from the main plant in the vicinity of the Engine Test. This unit similar to the main plant unit fully occupies at 20' X 40' Butler Building with the test bench separated from the mechanical installation. This arrangement, test bench and mechanical layout would closely approach the requirement for such an installation at Watertown. This unit had been used for testing toxic fuels and was equipped with safety showers. I was informed that we would not be confronted with the problem of handling toxic fuels more severe than kerosene.

B. The fuel calibration facility is a rather complex installation of piping, mechanical equipment, instrumentation and electrical work containing certain items of long lead time procurement such as the 350 KW motor generator unit and controls.

4. Cost Estimates

In addition to the test bench proper estimated at \$150,000, a tentative estimate of services including building, compressors, cooling tower and boiler is \$54,200.

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SECRETOHC-0850-60
PAGE THREE**5. Engine Test**

In view of the considerable discussion regarding the location of run-up pads and use of silencers, the opportunity was afforded to visit the Engine Test facility while one engine was undergoing test with the after-burner in operation. The test is located several miles from the main plant and could readily be heard at this distance. The jet blast was approximately at right angle to and away from the approach road. A marked increase in noise level was noticed at the approximate half mile distance approaching the sound. In driving to within about 200 feet of the forward end, the noise and vibration was extreme and would probably not be bearable for a very long period of time without ear protection. (We had no ear protection). In driving away from the sound, the break point of attenuation was noted again at the half mile distance.

It was convincing that the run-up area should be no closer to the base than one-half mile and preferably further especially with two engines in operation simultaneously. It was suggested that a rock barricade be constructed to intercept the sound.

6. No recommendations are submitted with this report.


Engineering Section
Material Branch
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